

**Toth et al.****S/N:10/605,789****REMARKS**

Claims 1, 2, 5-14, and 16-23 are pending in the present application. In the Office Action mailed April 22, 2005, the Examiner rejected claims 1, 2, and 7-10 under 35 U.S.C. §103(a) as being unpatentable over Romeas (USP 6,148,062), in view of Moore (USP 4,181,858). The Examiner next rejected claim 5 under 35 U.S.C. §103(a) as being unpatentable over Romeas in view of Moore, and further in view of Popescu (USP 6,501,828). Claim 6 was rejected under 35 U.S.C. §103(a) as being unpatentable over Romeas in view of Moore and Popescu, and further in view of Hsieh (USP 5,970,112). Claims 11, 14, and 16 were rejected under 35 U.S.C. §103(a) as being unpatentable over Moore in view of Popescu and Hoffman et al. (USP 6,137,857). Claims 12 and 13 were rejected under 35 U.S.C. §103(a) as being unpatentable over Moore in view of Popescu and Hoffman et al., and further in view of Hsieh. Claims 17 and 19-21 were rejected under 35 U.S.C. §103(a) as being unpatentable over Schmidt (USP 5,019,713) in view of Moore. Claim 18 was rejected under 35 U.S.C. §103(a) as being unpatentable over Schmidt in view of Moore, and further in view of Gunji et al. (JP08-266523). Claims 22 and 23 were rejected under 35 U.S.C. §103(a) as being unpatentable over Schmidt in view of Moore, and further in view of Winter (USP 4,998,268).

The Examiner objected to claims 2 and 19-21 because of certain informalities discovered by the Examiner. In the amendment made herewith, Applicant has corrected these errors, due solely to typographical mistakes, and greatly appreciates the Examiner's diligence in consideration of the present Application. Applicant has also amended claim 1 to further define the shape of the filters by incorporating the subject matter of dependent claim 7. Accordingly, claim 7 has been canceled.

With respect to the rejection of claim 1, the Examiner stated that the claim is unpatentable under 35 U.S.C. §103(a) over Romeas in view of Moore. The Examiner concluded that Romeas teaches all the elements of claim 1 except for the "at least one motor assembly." Accordingly, the Examiner relied upon Moore and stated that "[i]t would have been obvious... to incorporate the apparatus of Romeas with the motor of

Toth et al.

S/N:10/605,789

Moore, since one would be motivated to make such a modification to reduce manual labor for a user." Applicant believes, however, that 1) Romeas does not teach the shape of the first and second moveable filters as claimed, 2) it would not be obvious to combine Moore with Romeas to achieve such shape, 3) even if combined, Moore does not teach two filters having tails positioned at their distal ends relative to an x-ray source, and 4) it would not be obvious to modify Romeas to include the motor of Moore.

First, the Examiner principally relied upon Romeas as disclosing a second moveable filter having "a tail extending from the body, the tail positioned at a distal end of the second moveable filter relative to an x-ray source." However, as amended, claim 1 now includes the subject matter of claim 7. In the rejection of claim 7, the Examiner admitted that "Romeas does not disclose wherein the first and second moveable filters are each defined by a base, a tail, and a curved portion connecting the base to the tail." Therefore, the Examiner relied on Moore as teaching filters having "a body, a tail, and a curved portion connecting the base to the tail," as now called for in claim 1. The Examiner stated that "it would have been obvious... to incorporate the apparatus of Romeas as modified above with the filters of Moore... to better compensate for variations in path length of examining radiation through the body of a patient."

However, compensating plates 17 and 18 of Romeas shape an x-ray beam by providing rotating plate elements which operate in pairs, each pair of plate elements partially overlapping one another. Col. 3, lns. 40-56. The first plate elements 17a, 18a are described as having biconvex meniscus shapes, and are better viewed in Fig. 4. Col. 3, lns. 45-46. Romeas also describes first plate elements 17a, 18a as generally having constant thicknesses which produce uniform x-ray absorption, except that the portions of first plate elements 17a, 18a which overlap second plate elements 17b, 18b are beveled slightly to maintain uniform absorption. See Fig. 8; col. 4, lns. 44-45; col. 5, lns. 45-50.

In contrast, the filters of Moore are defined by wedge-shaped bodies 26 that are "relatively large at one end and then of decreasing thickness with length and ha[ve] a relatively thin part 26' of sufficient length to extend across the entire fan of radiation," and are accordingly configured for linear movement. Col. 6, lns. 20-27. Moore further

Toth et al.

S/N:10/605,789

states that the filters 26 "run[] on bearings 27 in tracks 28," and are moved by a "lead screw 29, driven by a motor 30... to drive each wedge in one or the other direction." *Id.* (Emphasis added.) At a minimum, it has not been established that a combination of the linearly movable filters of Moore and the rotational filter system of Romeas could reasonably be expected to achieve the Examiner's proffered motivation, "to better compensate for variations in path length of examining radiation through the body of a patient." Additionally, the filter plates of Romeas are beveled in order to maintain a "uniform compensation." Col. 4, lns. 44-45; col. 5, lns. 45-50. However, the filters of Moore have a curved thickness in order to produce differing absorption. *See* Col. 5, lns. 58-68, col. 6, lns. 1-3, 9-17. Therefore, one of ordinary skill in the art would not have been motivated to use the filters of Moore (configured for linear movement) in the system of Romeas (configured for rotational movement).

Furthermore, the apparatus of Moore does not include two filters having "tail[s] positioned at a distal end... relative to an x-ray source." (Emphasis added.) As illustrated in Fig. 2a, the thin part 26' of the upper wedge 26 extends from a distal end of the wedge body relative to an x-ray source, whereas the thin part 26' of the lower wedge extends from a proximate end of the wedge body relative to the same x-ray source. Therefore, neither Romeas nor Moore teach the shape and orientation of the claimed filters, and as discussed above, there is no motivation to combine the teachings of these references.

In addition, claim 1 calls for "at least one motor assembly configured to independently position a moveable filter such that a beam profile is created that substantially conforms to a shape of a subject to be scanned." The Examiner admitted that Romeas does not teach a motor assembly, but then stated that Romeas teaches a filter that is "configured to independently position a movable filter (fig. 5, #18b) such that a beam profile is created that substantially conforms to a shape of a subject to be scanned (fig. 5, #1)." As claim 1 explicitly calls for a motor assembly, not a filter, to be "configured to independently position a movable filter," the Examiner's assertion that Romeas teaches the claimed configuration is both inaccurate and irrelevant.

Toth et al.

S/N:10/605,789

The Examiner then relied upon Moore as teaching the general use of a motor assembly in a beam shaping apparatus, but did not assert that Moore teaches a motor configured as claimed. In addition, while Moore discloses a motor, the Examiner's proffered modification of Romeas by the teachings of Moore does not evince a reasonable expectation of success, and thus a *prima facie* case of non-obviousness has not been established. See MPEP §§ 2141, 2143. The filter plates of Romeas operate by rotation. Col. 3, lns. 43-47. However, the motor of Moore is configured to turn lead screws which move the filter bodies back and forth linearly. Col. 6, lns. 20-27. The ability of the plates of Romeas to rotate and slide over one another would be compromised if they were to be moved by a motor only capable of pushing or pulling by threaded engagement with a screw. One of ordinary skill thus would not be motivated to make such a combination, and such combination would change the principles of operation of these references in violation of MPEP §2143.01.

In sum, Romeas does not teach filters having the claimed shape, Moore does not teach filters having the claimed orientation, and there is no motivation to combine these two references to achieve the claimed shape and orientation. Furthermore, there is no motivation to combine the motor of Moore with the system of Romeas, and the Examiner has not established that either reference teaches the claimed configuration of a motor assembly. It thus appears that the Examiner attempted to include Romeas in the present rejection of claim 1 solely to satisfy the tail positioning limitation of claim 1, despite the clear inapplicability of Romeas to the teachings of both Moore and the present invention. A claim may not be used as a template for an Examiner to apply hindsight in finding each limitation in the known art. Therefore, a *prima facie* case of non-obviousness has not been met and Applicant respectfully requests that the rejection of claim 1, and all claims depending therefrom, be withdrawn.

Now with regard to the rejection of claim 11, the Examiner indicated that the claim is unpatentable under 35 U.S.C. §103(a) over Moore in view of Popescu and further in view of Hoffman et al. The Examiner stated that "Moore does not specifically disclose non-uniform filters mirroring each other... wherein [the] filters are arranged such

Toth et al.

S/N:10/605,789

that the curved portion of one filter faces the curved portion of the other filter.” Therefore, the Examiner relied upon Popescu as teaching “non-uniform filters mirroring each other (fig. 3)... arranged such that the curved portion of one filter (fig. 3, #22) faces the curved portion of the other filter (fig. 3, #23).”

However, the curved portions of the filters 22, 23 of Popescu do not “face each other,” as the phrase is used in claim 11. Rather, the curved portions of the filters 22, 23 of Popescu both face downwardly. Fig. 3. According to the Specification and Fig. 6 of the present Application, when filters face each other, the curved portion of one filter is oriented in the +y direction and the curved portion of the other filter is oriented in the -y direction, as shown. Therefore, the Examiner’s citation of Popescu is unhelpful, and does not establish that each and every element of claim 11 is taught by the art of record.

Furthermore, the Examiner has not provided any valid motivation to combine Moore with Popescu. The Examiner merely stated that the combination should be made “to simplify generation of a high-grade x-ray image of a region of interest (col. 2, lines 1-4) as implied from Popescu.” However, the cited portion of Popescu recites only broad language about the objects of x-ray imaging in general. Notwithstanding that the filters of Popescu are not oriented in accordance with claim 11, Popescu offers no explanation or reasoning whatsoever as to why one should orient the filters to face each other or in any other orientation. Thus, the Examiner has not established that each and every element is taught, has not provided a valid line of reasoning to suggest any modification, and therefore has not established a *prima facie* case of non-obviousness. MPEP §2143. Accordingly, Applicant respectfully requests that the rejection of claim 11, and all claims depending therefrom, be withdrawn.

In rejecting claim 17, the Examiner indicated that the claim is unpatentable under 35 U.S.C. §103(a) over Schmidt in view of Moore. Specifically, the Examiner stated that “Schmidt discloses an apparatus comprising moveable first and second filters (col. 2, lines 32-33), [and] a stationary third filter having a length (fig. 1, #15, and abstract, line 3) perpendicular to a central axis of x-ray projection from an x-ray source (col. 2, line 25).” With regard to Moore, the Examiner stated that the reference teaches “two motor

Toth et al.

S/N:10/605,789

assemblies (figs. 1a and 2a, #30) configured to independently position overlapping filters, defined by bases, curved portions, and proximate tails, in an x-ray path to define an attenuation profile that substantially approximates a target shape (fig. 2a)."

Schmidt, however, teaches only one "filter," contrary to the Examiner's assertions. That is, Schmidt distinguishes between a wedge-shaped filter 15 that provides attenuation and aperture plates 12a-d which define an irradiation field. Col. 2, lns. 25-32, 46-68. That is, aperture plates 12a-d behave like a collimator rather than a filter. *Id.* Furthermore, if the filters of Moore were to be incorporated into Schmidt for use with the wedge-shaped filter, the precise and relatively simple isodose calculations that are critical to the invention of Schmidt would no longer be accurate because radiation would be incident upon separate filters of various shapes at various distances from the beam source, also resulting in the slope of the attenuation curve becoming complex and irregular. Thus, Schmidt would be rendered unsatisfactory for its intended purpose. MPEP §2143.01.

Likewise, the incorporation of motor assemblies "configured to independently position a respective filter in an x-ray path to define an attenuation profile that substantially approximates a target shape" into the system of Schmidt would not be obvious. Schmidt teaches that the only moving parts of the system therein are the aperture plates 12a-d which are used to produce a rectangular irradiation field. Col. 2, lns. 32-34. Schmidt specifically states that the filter 15, the only body whose attenuation coefficient is considered in calculations, is stationary so that a uniform dosage may be applied over time. Col. 1, lns. 53-54, col. 2, lns. 53-65. As with the inclusion of additional filters, modification of Schmidt to include a motor configured to move the filter 15 or other added filters to define an attenuation profile that approximates a target shape would be contrary to, and render Schmidt unsatisfactory for, its intended purpose.

To summarize, Schmidt does not teach each and every element of claim 17 and one of ordinary skill in the art would not be motivated to combine Schmidt and Moore. Accordingly, Applicant respectfully requests that the rejection of claim 17, and all claims depending therefrom, be withdrawn.

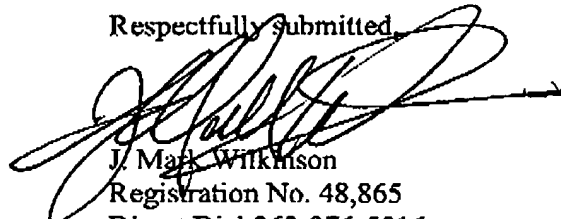
**Toth et al.**

**S/N:10/605,789**

Therefore, in light of at least the foregoing, Applicant respectfully believes that the present application is in condition for allowance. As a result, Applicant respectfully requests timely issuance of a Notice of Allowance for claims 1, 2, 5-6, 8-14, and 16-23.

Applicant appreciates the Examiner's consideration of these Amendments and Remarks and cordially invites the Examiner to call the undersigned, should the Examiner consider any matters unresolved.

Respectfully Submitted,



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